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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/290,777 04/13/99 STUTSMAN

D 20153

EXAMINER

QM31/0619

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ART UNIT

PAPER NUMBER

3722

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/290,777	STUTSMAN, DAVID
	Examiner Erica E Cadugan	Art Unit 3722

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 04 April 2001.
- 2a) This action is FINAL.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1 and 3-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1, 3-20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

#### Attachment(s)

- 15) Notice of References Cited (PTO-892)
- 16) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 18) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 19) Notice of Informal Patent Application (PTO-152)
- 20) Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Faxing of Responses to Office Actions***

1. In order to reduce pendency and avoid potential delays, TC 3700 is encouraging FAXing of responses to Office Actions directly into the Group at (703) 305-3579. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into TC 3700 will be promptly forwarded to the examiner.

### ***Claim Rejections - 35 USC § 103***

2. Claims 1 and 3-20 are rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 1,761,841 (Nenninger) in view of Machinery's Handbook, 25<sup>th</sup> ed., 1996, pages 2378 and 2379. Nenninger teaches a machine tool spindle 29 (page 1, line 86) that is fixed on one end and allowed to move axially with respect to the rotational axis of the spindle on the other end as the spindle expands and contracts due to variances in temperature (page 2, lines 22-37 and 128-130). The spindle is mounted in a column or housing C (see Figure 1), and is supported with a roller bearing 74 (Figure 5) at one end of the spindle and with bearings 25, 26 (Figure 4) on the opposite end of the spindle. The bearings have inner and outer races (Figures 4 and 5) and are seated against outwardly facing annular surfaces of sleeves 70 and 18, respectively (Figures 4 and 5). The bearing 74 is mounted on the rear of the spindle (page 1, line 62), and floats or axially moves within sleeve 70 (page 2, lines 110-130). Rigid annular sleeve 70 is disposed between bearing 74 and the housing (Figure 5) and is fixed with respect to (or "bonded to") the housing via stud screw 72 (Figure 5 and page 2, lines 114-116). The spindle 29 has a nose 30

that is adapted to engage a cutter arbor or "tool holder" (page 1, column 85-87). As shown in

Figure 5, it appears that the bearing seat is slightly oversized with respect to the sleeve 70.

Nenninger also specifically teaches that the bearing cone 27 is press fit onto the spindle, and states that the other bearing 74 "floats with the end of the spindle" (page 2, lines 128-129), implying that the bearing 74 is mounted so as to be fixed to the spindle and is thus also press fit onto the spindle. Specifically regarding claim 18, element 75 is a spacer sleeve, and the spacing sleeve 75 is located on the spindle axially between the inner races of bearings 74 and 23, 25, 27 (Figures 4 and 5).

Specifically regarding claim 19, nut 77 is threaded onto the spindle (Figure 5). Specifically regarding claim 20, cover plate or cap plate 63 is shown in Figures 2 and 4 as engaging the outer bearing race 23. Specifically regarding claim 12, as shown in Figures 4 and 5, it appears that the annular inner surfaces of the openings which seat the sleeves 70 and 18 are of a slightly larger diameter than the outer diameters of the annular outer surfaces of the sleeves 70 and 18. Specifically regarding claim 13, Nenninger does not specifically teach that the diametral difference is in the range between 0.010 and 0.015 inches. Specifically regarding the seating of the bearings, the bearings 74 and 23, 25, 27 are both seated within enlarged portions of their respective sleeves rather than enlarged portions of the housing (see Figures 4 and 5), and abut against outwardly facing annular surfaces of these sleeves. Nenninger does not teach that the sleeves are held in place via an epoxy resin adhesive, but instead teaches the use of stud screw 72 to fix sleeve 70 as described above, and also teaches the use of washer ring 20 in conjunction with bolts 21, and clamp nut 33 with set screw 34 to fix sleeve 18 (see Figure 4). Specifically regarding the enlarged portion of the seat, it is immaterial to the function of Nenninger's invention as to whether the lips or flanges which form the outwardly facing annular

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surfaces are part of the sleeve, or whether these flanges are separate from the sleeves and are integral with the housing C (which if these flanges are integral with the housing, these flanges form enlarged openings within the housing by virtue of the smaller opening at the radially inner surfaces of the flanges). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the flanged portions of the sleeves integral with the housing, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art.

Howard v. Detroit Stove Works, 150 U.S. 164 (1893). Specifically regarding the epoxy resin adhesive, Machinery's Handbook, 25<sup>th</sup> ed., 1996, pages 2378 and 2379 teaches the use of "epoxy resin adhesive" to bond metal to metal, and further teaches that appropriate "curing parameters" are selected based on the intended use of the adhesive. Machinery's Handbook further teaches the benefits of such adhesives over mechanical fastening devices. Particularly note page 2378, paragraphs 1 and 2, which states:

"Joining materials with adhesives offers significant benefits compared with mechanical methods of uniting two materials.

Among these benefits are that an adhesive distributes a load over an area rather than concentrating it at a point, resulting in a more even distribution of stresses. The adhesive bonded joint is therefore more resistant to flexural and vibrational stresses than, for example, a bolted, riveted, or welded joint. Another benefit is that an adhesive forms a seal as well as a bond. This seal prevents the corrosion that may occur with dissimilar metals, such as aluminum and magnesium, or mechanically fastened joints, by providing a dielectric insulation between the substrates. An adhesive also joins irregularly shaped surfaces more easily than does a mechanical fastener. Other benefits include negligible weight addition and virtually no change to part dimensions or geometry."

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have applied epoxy resin adhesive (rather than the fixing arrangement utilizing the stud screw 72 described by Nenninger) to one or both of the outer surface of the

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fixed sleeves 70 and 18 taught by Nenninger, or the inner surface of the housing taught by Nenninger, to fix the sleeves with respect to the housing, and to have let this adhesive set for the purpose of providing Nenninger's device with a load that is distributed over an area rather than concentrating it at a point, resulting in a more even distribution of stresses, or for providing a joint that is more resistant to flexural and vibrational stresses as taught by Machinery's Handbook. Specifically regarding claim 13, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have made the inner annular surface of the housing as much larger than the outer surface of the sleeve as was desired or expedient, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

***Response to Arguments***

3. Applicant's arguments filed September 20, 2000 have been fully considered but they are not persuasive.
4. Regarding applicant's statement "[b]y providing sleeves on the bearings and then adhesively securing the sleeves to the annular surfaces of the bearing seats, the bearings and spindle not only maintain concentricity but allow the bearings to displace axially relative to the spindle", note that Nenninger specifically teaches that the bearing shown in Figure 5 floats with the end of the spindle inside of the bore of sleeve 70 (above rejection based thereon as well as in the Nenninger patent, page 2, lines 128-130).
5. Regarding applicant's statement that "the adhesive does not apply any force at any localize area as a threaded member as in the Nenninger structure, its use will not disturb the

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concentricity of the spindle assembly”, implying that an adhesive is not an obvious substitute of a stud screw, applicant’s attention is directed to the Machinery’s Handbook, 25<sup>th</sup> ed., 1996, pages 2378 and 2379 (utilized in the above art rejection), which is provided by the Office to show that the use of adhesives, particularly of epoxy resin adhesives, and the benefits and advantages thereof, are notoriously well-known in the art of fastening. The Machinery’s Handbook teaching provides evidence that the use of the epoxy resin adhesive, the benefits thereof over other mechanical fastening devices, and the curing of this adhesive are all things that would be within the level of ordinary skill in the art. Particularly note page 2378, paragraphs 1 and 2, which states:

“Joining materials with adhesives offers significant benefits compared with mechanical methods of uniting two materials.

Among these benefits are that an adhesive distributes a load over an area rather than concentrating it at a point, resulting in a more even distribution of stresses. The adhesive bonded joint is therefore more resistant to flexural and vibrational stresses than, for example, a bolted, riveted, or welded joint. Another benefit is that an adhesive forms a seal as well as a bond. This seal prevents the corrosion that may occur with dissimilar metals, such as aluminum and magnesium, or mechanically fastened joints, by providing a dielectric insulation between the substrates. An adhesive also joins irregularly shaped surfaces more easily than does a mechanical fastener. Other benefits include negligible weight addition and virtually no change to part dimensions or geometry.”

6. Regarding applicant’s assertion that Nenninger (U.S. Patent No. 1,761,841) “does not provide any sleeve between a bearing seat and a bearing”, applicant’s attention is directed to the above rejection based thereon which states “[t]he bearings have inner and outer races (Figures 4 and 5) and are seated against outwardly facing annular surfaces of sleeves 70 and 18, respectively (Figures 4 and 5).” Particularly note Figure 5 which shows the sleeve 70 located between a “bearing seat” and a bearing. Note that the inner surface against which the outer

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surface of the sleeve 70 rests inherently serves as a “bearing seat”, as that location serves as a “seating” surface for the bearing sleeve 70.

7. Applicant has asserted that Nenninger does not teach the claimed method because “[t]here is no disclosure of assembling the components in the sequence recited in Applicant’s claims or applying an adhesive for securing the sleeves to the bearing seats as recited in Applicant’s claims”. Note that the rejection based on Nenninger is an 35 U.S.C. 103 rejection which states that it would be obvious to substitute the claimed adhesive for the stud screw in Nenninger’s invention, and thus that the Office has not asserted that Nenninger specifically teaches such an adhesive. It is unclear what sequence of steps that Applicant is asserting that Nenninger does not teach. If Applicant is asserting that Nenninger does not teach the sequence of applying adhesive between a sleeve and a seat and then allowing the adhesive to set, again, note that the Office has not asserted that Nenninger teaches these steps, but that they would be obvious to one of ordinary skill in the art, as is evidenced by the Machinery’s Handbook, pages 2378-2379. The Machinery’s Handbook teaches that appropriate curing parameters are essential when using an adhesive, which curing is equivalent to the claimed “setting” of the adhesive. As for the “sequence”, note that the adhesive must be applied before it can be allowed to “set”, or the desired parts will not be joined. Regarding the other claimed method steps, applicant’s attention is directed to the above art rejection based on Nenninger. For example, claim 15 claims “mounting said spindle on one of an inner race and an outer race of a first bearing”. Nenninger teaches a first bearing that is mounted on a spindle as described above, and therefore, the step of “mounting” as claimed by applicant had to have occurred to produce Nenninger’s invention.

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8. Regarding Applicant's assertion that "[t]he secondary reference relating to adhesives simply indicates that adhesives may be used to achieve metal-to-metal bonding. It does not teach or suggest the use of an adhesive to secure a sleeve containing a bearing to a bearing seat as provided for in Applicant's claims.", it is noted that the Office has not asserted that the Machinery's Handbook, pages 2378-2378 teaches the use of adhesives to secure a bearing to a bearing sleeve, but that the Office has asserted that the benefits of adhesives (particularly those set forth above which teach the benefits of adhesives over mechanical fasteners) are so well-known as to be found in a shop manual such as the Machinery's Handbook, and would thus be known to one of ordinary skill in the art.

***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erica E. Cadugan whose telephone number is (703) 308-6395. The examiner can normally be reached on M-F, 7:30 a.m. to 5:00 p.m., alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrea L. Wellington can be reached on (703) 308-2159. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-3579 for regular communications and (703) 308-3579 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.



WILLIAM BRIGGS  
PRIMARY EXAMINER



ee<sup>c</sup>

June 12, 2001